b) Remarks

Turning first to the Office Action Summary Sheet, Claims 1-20 are pending in this application. Claims 1-9 and 14-20 are withdrawn from consideration. Claims 10-12 are rejected. Claim 13 is objected to. The drawings filed on September 22. 2005 are accepted.

Turning now to the merits, the remainder of this Reply is set forth under appropriate headings, for the convenience of the Examiner.

Rejection of Claims 10-12

Claims 10-12 are rejected under 35 U.S.C. §102(b) as being anticipated by Gordish et al. (U.S. Patent No. 5,233,160).

The Office Action states that the reference discloses a cored electrode having a steel sheath and that the filler within the sheath contains sodium oxide and other materials. The Office Action also states that additionally, the filler may contain magnesium oxide, that sodium oxide is present in the range of 0.8 to 3.2 and that other slag forming constituents are aluminum oxide, calcium fluoride, metallic silicon, iron oxides and metallic iron. The Office Action further states that typically flux formulations are 13.5 to 16.5 % and that aluminum oxide ranges up to 1.4%, calcium fluoride ranges up to 1.2%, iron oxide up to 0.6%, metallic silicon up to 8.5% and metallic iron up to 14.7%.

This rejection is respectfully traversed.

Applicant's invention relates to the field of submerged arc welding (SAW). In the SAW process, the arc and the molten metal are shielded from atmospheric oxygen and nitrogen by a blanket of fusible granular flux, which covers the arc. See, e.g., Fig. 1 and paragraphs 2, 13 and 14 of the application.

The claims under consideration are directed to a tubular weld wire comprising a sheath encapsulating a core. The claims specify a core formulated for submerged arc

welding which includes one or more non-metallic compounds selected from the group consisting of Al_2O_3, Na_2O_3, $MgCO_3$, MgAl, CaF_2, $CaCO_3$, CaF_2, MgO and combinations thereof; the total percentage of the one or more non-metallic compounds in the core composition ranges from about 1% Wt to about 30% Wt.

The claimed tubular weld wire, having a core formulated for submerged arc welding, addresses specific needs encountered in SAW processes. This is discussed, for example, in paragraph 015 of the specification:

> The compositions were selected based on the following considerations. When the flux melts, it creates a molten slag which forms a physical barrier between the molten metal of the work piece and the atmosphere (in particular, the nitrogen and oxygen). The difficulty in selecting the appropriate composition of the wire, and especially the core composition, is in coming up with such molten slag system that is sufficiently viscous and, at the same time, sufficiently liquid for the purpose of the SAW process. In particular, on the one hand, the molten slag should be viscous enough to remain above the molten metal of the work piece and not drop off the weld piece, as it could be the case if the molten slag were too liquid. On the other hand, the molten slag shouldn't be too viscous to prevent degazation of the molten pool of metal below the molten slag. Also, careful consideration has been given to the properties of the slag/metal interface to achieve the desired ease of removing the slag from the weld after the SAW process is complete and the slag and the work piece have solidified and cooled down. To achieve the desired property of the slag/metal interface, the composition of the slag (and, consequently, the core composition of the tubular wire), should be such that the molten slag should have a higher solidification temperature than that of the molten metal of the work piece. If the slag stays molten longer than the metal of the work piece, the weld bead has a better appearance. Also, there needs to be a sufficient difference between the coefficients of thermal expansion of the slag and the metal of the work piece to allow the solid slag to be easily removed from the solid weld.

In order to be anticipatory under section 102(b), a single reference must disclose each and every element of the claimed invention[1]. Those elements must be either inherent or expressly disclosed[2], and they must be arranged as in the claim[3]. For anticipation, there must be no difference between the claimed invention and the references disclosed, as viewed by a person of ordinary skill in the field of the invention[4].

---

[1] In re Paulsen, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994)
[2] Constant v. Advanced Micro-Devices, 7 USPQ2d 1057 (Fed. Cir. 1988)
[3] Richardson v. Sizuki Motor Co., 9 USPQ2d 1913 (Fed. Cir. 1989)
[4] Scripps Clinic & Research Found. V. Genentech, Inc., 18 USPQ2d 1001 (Fed. Cir. 1991)

Gordish et al. teach a consumable welding electrode for electric arc welding in a shielding gas:

> The present invention involves an electrode for using a shielding gas, such as carbon dioxide or argon blends with carbon dioxide. This external gas is employed to shield the weld pool and the arc from adverse gases contained in the atmosphere. Consequently, the shielding gas forms an envelope around the arc and above the weld metal pool to exclude the atmosphere. This shielding gas, in the present invention, is used because the flux formulation is not designed to produce its own self shielding gas or to produce a weld deposit chemistry that can develop sound welds without the use of an external shielding gas.

Gordish et al. at Col. 8, lines 36-47.

Specific flux formulations taught by the reference include aluminum oxide and calcium fluoride in an amount, respectively, of up to 1.4 Wt. % and up to 1.2 Wt., with a combined maximum amount of 2.6 Wt. %. See Gordish et al., table bridging Cols. 12 and 13.

Thus Gordish et al. do not disclose a core formulated for submerged arc welding as specified in Claims 10-12.

Furthermore, the reference does not disclose the presence of compacted FeMg, as recited in Claim 11. In fact, as discussed at Col. 12, lines 41-51, Gordish et al. explicitly exclude the presence of magnesium:

> Magnesium is excluded as an alloying ingredient since magnesium interferes with the deoxidization by the aluminum powder. Magnesium is a very high reactive material which can reduce aluminum oxide to aluminum resulting in aluminum being inadvertently transferred to the weld bead, thus adversely affecting the strength of the weld bead. In addition, the reduction of aluminum oxide by magnesium will inhibit the metallic aluminum reacting with the oxygen and nitrogen during welding to reduce fume during welding.

With respect to present Claim 12, there is no disclosure in Gordish et al. of a core formulation that includes one or more non-metallic compounds selected from the group consisting of Al_2O_3, Na_2O_3, $MgCO_3$, MgAl, CaF_2, $CaCO_3$, CaF_2, MgO and combinations thereof, wherein the total percentage of one or more non-metallic compounds in the core ranges between 5% Wt and 15% Wt. Specifically, the cited document does not disclose the presence of Na_2O_3, $MgCO_3$, MgAl, $CaCO_3$, or MgO. With respect to aluminum oxide and calcium fluoride, individually or in combination, the cited reference does not disclose an amount within the range between 5% Wt and 15% Wt.

Therefore, Claims 10-12 are not anticipated under 35 U.S.C. §102(b) by Gordish et al.

Allowable Subject Matter

Claim 13 was objected to as being dependent upon a rejected base claim. The Office Action states that the claim would be allowable if rewritten in independent form including all the limitation of the base claim and any intervening claims.

In view of the remarks presented above, Applicant postpones rewriting Claim 13 at this time.

CONCLUSIONS

Applicant acknowledges the allowable subject matter (Claim 13) and believes that the rejection of Claims 10-12 under 35 U.S.C. 102(b), based on Gordish et al., has been traversed.

Should any questions arise, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

Houston Eliseeva LLP

By _____
Maria Eliseeva
Registration No.: 43,328
Tel.: 781 863 9991
Fax: 781 863 9931

4 Militia Dr., Suite 4
Lexington, Massachusetts 02421
Date: January 18, 2006